

IN THE CLAIMS:

1 1 - 29. (Cancelled)

1 30. (Previously Presented): A storage system adapted to provide on-disk representations
2 of one or more predetermined files served by the storage system, the system comprising:
3 an operating system resident in a memory and invoking storage operations in sup-
4 port of a file system configured to logically organize information as a hierarchical struc-
5 ture of directory and file inodes on the disk, each of the files having one or more associ-
6 ated file attributes stored on the disk as a representation embodying a stream inode asso-
7 ciated with a file inode.

1 31. (Currently Amended): The storage system of claim 30 wherein each on-disk file
2 inode includes a reference to at least one stream inode.

1 32. (Previously Presented): The storage system of claim 30 wherein the predetermined
2 file comprises a NTFS file.

1 33. (Currently Amended): A multi-protocol data access storage system adapted to pro-
2 vide on-disk representations of at least one file served by the storage system, the system
3 comprising:
4 an operating system resident in a memory of the storage system and configured to
5 invoke storage operations in support of a file system configured to logically organize in-
6 formation as a hierarchical structure of directory and file inodes on the disk, the operating
7 system including a file system protocol layer configured to provide data access in support
8 of a plurality of file system protocols, each of the files stored on the disk as a representa-
9 tion embodying a stream inode associated with a file inode.

1 34. (Currently Amended): The storage system of claim 33 wherein each on-disk file
2 inode includes a reference to at least one stream inode.

1 35. (Previously Presented): The storage system of claim 34 wherein each on-disk file
2 inode includes a default stream.

1 36. (Previously Presented): A system adapted to provide on-disk representations of at
2 least one file within a filer, the system comprising:
3 a processor;
4 a memory coupled to the processor and having locations addressable by the proc-
5 essor;
6 at least one disk coupled to the memory and processor; and
7 an operating system resident in the memory locations and invoking storage opera-
8 tions in support of a file system configured to logically organize information as files on
9 the disk, each of the files stored on the at least one disk as a representation embodying a
10 stream inode associated with a file inode.

1 37. (Previously Presented): The system of claim 36 wherein each on-disk file inode in-
2 cludes a default data stream.

1 38. (Previously Presented): The system of claim 36 further comprising a storage adapter
2 interconnected with the processor, memory and disk, the storage adapter cooperating with
3 the operating system to access the information stored on the disk.

1 39. (Previously Presented): The system of claim 36 further comprising a network adapter
2 coupled to the processor and memory of the filer, the network adapter connecting the filer
3 to a client over a computer network, the client interacting with the filer by exchanging

4 packets encapsulating a record requesting file services from the filer using a file system
5 protocol over the network.

1 40. (Previously Presented): The system of claim 39 wherein the file system protocol is a
2 Common Internet File System (CIFS) protocol and wherein the record is a CIFS record
3 comprising information pertaining to an operation directed to the named stream inode.

1 41. (Previously Presented): The system of claim 40 wherein the operating system com-
2 prises a series of software layers, including a file system protocol layer configured to
3 support the CIFS protocol and a file system layer.

1 42. (Previously Presented): The system of claim 41 wherein the CIFS record is inter-
2 preted as directed to a named data stream associated with a file and transformed into a
3 message structure by the CIFS layer, and further passed to the file system layer, where
4 the operation is performed.

1 43. (Previously Presented): The system of claim 42 wherein the message is passed from
2 the CIFS layer to the file system layer as a function call.

1 44. (Previously Presented): The system of claim 42 wherein the file system layer loads
2 the stream inode from disk into memory and accesses the stream inode as instructed by
3 the operation.

1 45. (Previously Presented): The system of claim 41 wherein the operating system further
2 comprises a media access layer of network drivers, network protocol layers, a disk stor-
3 age layer that implements a disk storage protocol and a disk driver layer that implements
4 a disk access protocol.

1 46. (Previously Presented): The system of claim 45 wherein a storage access request data
2 path through the operating system layers enables performance of data storage access for
3 the client request received at the filer.

1 47. (Previously Presented): The system of claim 46 wherein the storage access request
2 data path is implemented as logic circuitry embodied within a hardware circuit.

1 48. (New): The storage system of claim 30 wherein the stream inode comprises a type
2 field designating the stream inode as a stream type.

1 49. (New): The storage system of claim 33 wherein the stream inode comprises a type
2 field designating the stream inode as a stream type.

1 50. (New): The system of claim 36 wherein at least one of the files is stored on the at
2 least one disk as a representation embodying the stream inode associated with a stream
3 directory inode, the stream directory inode further associated with the file inode.

1 51. (New): The system of claim 50 wherein the stream directory inode comprises a type
2 field designating the stream directory inode as a stream directory type.

1 52. (New): The system of claim 50 wherein the stream directory inode is further associ-
2 ated with a stream directory, and wherein the stream directory is a hidden directory.

1 53. (New): The system of claim 50 wherein the stream directory inode comprises a data
2 section including a pointer referencing a stream directory data block associated with the
3 stream inode.

1 54. (New): The system of claim 50 wherein the file inode comprises a flag identifying
2 the file inode as being associated with a plurality of data streams.

1 55. (New): The system of claim 54 wherein the file inode comprises a data section in-
2 cluding a default data stream.

1 56. (New): The system of claim 50 wherein the stream directory inode comprises a first
2 pointer referencing an access control list inode associated with access control list infor-
3 mation.

1 57. (New): The system of claim 56 wherein the file inode comprises a second pointer
2 referencing the access control list inode, the first pointer comprising a copy of the second
3 pointer, and wherein the second pointer is modified to reference the stream directory
4 inode.

1 58. (New): The system of claim 36 wherein the stream inode comprises a type field des-
2 ignating the stream inode as a stream type.

1 59. (New): The system of claim 36 wherein the stream inode comprises a pointer refer-
2 encing the file inode.

1 60. (New): The system of claim 36 wherein the file inode includes a reference to the
2 stream inode.

1 61. (New): The system of claim 36 wherein the memory is further configured to store an
2 incore inode structure comprising a representation of the file inode and a representation
3 of the stream inode.

1 62. (New): The system of claim 61 wherein the stream inode comprises a pointer refer-
2 encing the file inode, and wherein the representation of the stream inode comprises a
3 pointer referencing the representation of the file inode.

1 63. (New): The system of claim 61 wherein the representation of the file inode com-
2 prises a copy of the file inode, and wherein the representation of the stream inode com-
3 prises a copy of the stream inode.

1 64. (New): The system of claim 36 wherein the filer comprises a multi-protocol data
2 access storage system.

1 65. (New): A method of representing information served by a storage system, the
2 method comprising the steps of:
3 organizing the information as a plurality of files associated with a plurality of
4 inodes on a disk, wherein each inode of the plurality of inodes comprises metadata asso-
5 ciated with a corresponding file of the plurality of files and further comprises one or more
6 references to a one or more data blocks on the disk;
7 associating a first inode of the plurality of inodes with a first file of the plurality
8 of files as a file inode;

9 organizing a logically contiguous stream of data blocks within the first file as a
10 data stream; and
11 associating a second inode of the plurality of inodes with the data stream as a
12 stream inode.

1 66. (New): The method of claim 65 wherein a reference of the plurality of references of
2 the file inode comprises a reference to the stream inode.

1 67. (New): The method of claim 65 wherein the plurality of inodes further comprises a
2 plurality of directory inodes, each directory inode comprising metadata associated with a
3 corresponding directory of a plurality of directories and further comprising references to
4 at least one inode of the plurality of inodes.

1 68. (New): The method of claim 67 wherein a given reference of the references to at
2 least one inode comprises a first pointer referencing a directory data block of the plurality
3 of data blocks, the directory data block comprising a second pointer referencing the at
4 least one inode.

1 69. (New): The method of claim 67 wherein a given directory inode of the plurality of
2 directory inodes further comprises a stream directory inode associated with the file inode
3 and referencing the stream inode.